Lauraceae, Leguminosae, and Celastraceae. The members of the Myrtales also were probably dwellers in the dry or wet strand. Many of the plants probably demanded a heavy rainfall, with emphasis on the warm temperate rain forest types. Such areas as southern Japan or northern New Zealand offer many points of comparison with the Upper Cretaceous floras of the coastal plain. The climate then was equable within the limits embraced between warm temperate and subtropical. The floras of the Eutaw and Ripley formations are treated similarly by BERRY, who concludes the introductory portion of the monograph with a consideration of correlations and the presentation of a table of the distribution of the three floras minutely analyzed. The work ends with a detailed account of the fossil plants, with the description of several new species illustrated with 33 fine plates of geological scenery and fossil plants.—J. W. HARSHBERGER.

Wood structure and conductivity.—HOLMES[8] has made a quantitative study of the anatomy of ash wood, attention being directed chiefly to the size and proportion of the water-conducting elements in different parts of a shoot. As in the case of the hazel wood previously investigated by this author, year old ash shoots were selected, most of the specimens being typical coppice, stool shoots, long, thick, and unbranched. His results are presented in graphical form, a set of curves being constructed for each shoot.

Curve A gives the variation in area of the wood at selected levels along each shoot. Curve B, representing the absolute conductivity or total volume of transmitted water, is obtained by calculating the total number of vessels in a transverse section at the different levels and the average diameter of the cavities of these vessels. This curve shows a decline from the base to the apex of the shoot. Curve C serves as a measure of the specific (or relative) conductivity for water, or the percentage of wood area occupied by vessel cavities. In general this curve rises and then falls, the upper (younger) part of the stem being a better conductor of water per unit area than that nearer the base. An increase in the proportion of fibers in any part of the shoot, usually at the base where mechanical support is necessary, quite obviously lowers the specific conductivity in that portion of the stem.

In comparing the ash with the hazel wood, the writer finds in both a fall in absolute conductivity and a rise in specific conductivity from the base of the shoot to its apex, but the figures for specific conductivity are much higher in hazel than in ash, due to its greater number of conducting elements per unit area.

In the main, these results agree with those obtained by FARMER[9] for the two kinds of wood in question, in his extensive investigations for determining

[8] HOLMES, M. G., Observations on the anatomy of ash-wood with reference to water-conductivity. Ann. Botany **33**:255–264. *figs. 7.* 1919.

[9] FARMER, J. B., On the quantitative differences in the water-conductivity of the wood in trees and shrubs. Proc. Roy. Soc. **90**: 1918.

specific and absolute conductivity. FARMER calls attention further to the close resemblance between coppice-shoots and saplings of the ash and hazel in respect to their water-conducting systems, and to the difference existing between the coppice-shoots and the normal adult wood of these species.—LADEMA M. LANGDON.

After-ripening and germination of rice.—KONDO[10] has done some very interesting work on the germination of rice seeds. Seeds gathered in the milk stage and put into a germinator immediately show little germination, even after 30 days. Those stored in a condition permitting drying for 15 days, or those stored without drying for 30 days, after-ripen and show a considerable improvement in germination. With after-ripening germination sometimes exceeds 50 per cent. Seeds harvested in the yellow ripe stage show little germination when immediately placed in a germinator, but they improve in germination relatively rapidly with storage, whether the storage conditions permit drying or not, and after 4 months of storage give as good germination as seeds harvested fully ripe. Seeds harvested fully ripe germinate fairly well immediately, but are considerably improved by after-ripening. Seeds harvested dead ripe do not need after-ripening, but are immediately capable of prompt and good germination.

While drying hastens the after-ripening of seeds collected in the milk or yellow ripe stage, those after-ripening without drying finally give quicker and better germination than those after-ripened with drying. The presence of the hulls interferes with after-ripening. A few hours of sun-drying of the fresh seeds favors germination. Diffuse light has no effect on the germination of fully ripened seeds, but it favors the germination of those not fully after-ripened. Germination percentage and energy both rise with progress in the maturity and after-ripening of the seeds. Many grains of rice show abnormal germination. In many of the seeds collected in the milk stage only the radicle grows. In the yellow ripe, fully ripe, and dead ripe grains the abnormality is shown by the growth of the plumule only, often followed later by many secondary roots.

The matter of dormancy and after-ripening of cereal seeds is giving seed testers and other practical workers no little concern, especially in regions where ripening occurs during cool or wet weather.—WM. CROCKER.

Anthocyanin.—The distribution of anthocyanin in varieties of *Coleus hybridus* has been studied by KÜSTER,[11] who classifies the patterns in two groups: (1) sectional, mottled, and pulverulent; (2) areas with curved boundaries and circular flecks. These groups of patterns are traced to different origins. Patterns of the first group are traced to qualitatively

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[10] KONDO, MONTARO, Über Nachreife und Keimung veschieden reifer Reiskorner. Ber. Ohara Inst. Landw. Forsch. 1:361–387. 1919.

[11] KÜSTER, ERNST, Die Verteilung des Anthocyans bei Coleusspielarten. Flora 110:1–33. 1917.